

REMARKS

Claims 1-17 are pending in this application. Claims 18-49 were withdrawn in response to a restriction requirement wherein the Applicant elected Claims 1-17. Applicant reserves the right to file continuing applications directed to the non-elected claims, Claims 18-49.

In the "Detailed Action" portion of the Office Action mailed June 7, 2004, the Examiner cited and discussed two references, U.S. Patent No. 6,333,776 to Taniguchi ("Taniguchi") and U.S. Patent No. 5,756,238 to Barr et al. ("Barr"). In the Notice of References Cited (Form PTO-892), only the Taniguchi reference was listed. Applicant's attorney telephoned the Examiner on June 30, 2004 to discuss the apparent oversight, and the Examiner requested that this request to have the Barr reference added to the Notice of References Cited should be included in Applicant's response.

In a Preliminary Amendment mailed September 15, 2003, Claim 9 was incorrectly listed as being amended. Claim 9 was not amended in the Preliminary Amendment, and is not amended in this paper. Thus, Claim 9 is, and always has been, as originally filed. Of the claims under examination, only Claim 16 was previously amended.

Claim Rejections under 35 USC § 112

Claims 1-14, 16 and 17 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

U.S.S.N. 10/623,364
Smith
Amendment and Request for Reconsideration

Claims 1-14

Claim 1 is an independent claim from which Claims 2-14 depend, either directly or indirectly. Thus, Claims 2-14 include all of the limitations of Claim 1. The Examiner rejected Claim 1 under 35 USC § 112, second paragraph, stating that the limitation of "an encoded face of an optical element" is "unclear because an optical element seems to refer to element 206 and the encoded face is on a separate structure 208." In this paper, Applicant has amended Claim 1 to include "an encoded face of a reticle" wherein "an optical element is mounted on the reticle." Thus, the optical element and encoded face are distinguished. The amendment is fully supported by the specification, for example, see page 7, lines 11-12, which states that a source "illuminates a reticle 208 that includes an optical element and a face encoded with measurement fiducials."

Applicant respectfully submits that pending Claim 1 is in compliance with 35 USC § 112, second paragraph, because it particularly points out and distinctly claims the subject matter which the applicant regards as the invention, and is therefore in condition for allowance. In addition, because Claims 2-14 depend, either directly or indirectly, from Claim 1, Claims 2-14 are also in compliance with 35 USC § 112, second paragraph, and are also in condition for allowance.

Claims 16 and 17

The Examiner rejected Claim 16 under 35 USC § 112, second paragraph, stating that the "structural relationship of 'a condensing lens' and 'an illumination modifying optic' is unclear."

U.S.S.N. 10/623,364
Smith
Amendment and Request for Reconsideration

Applicant respectfully submits that Claim 16 complies with 35 USC § 112, second paragraph, and does not require amendment. Claim 16 recites the limitation of "inserting an illumination modifying optic between a light source and a condensing lens thereby forming an effective light source." It is submitted that those skilled in the art would understand the relative structural positions of the light source, condensing lens, and illumination modifying optic as recited in the claim. However, Applicant would like to draw the Examiner's attention to the specification, page 7, lines 17-23, and Figure 2. As described in the specification, an illumination matching optic (IMO) 202, "includes an effective light source (ES) 204", and the "effective light source (ES) 204 includes a light source (LS) 210 and a condensing lens (CL) 212." The specification goes on to describe that the "effective light source (ES) 204 also includes an illumination modifying optic IM 214 that is located at a conjugate aperture stop (CAS) 216 of the lithography projection tool 220." Thus, the description and Figure 2 provide an exemplary structural relationship of an illumination modifying optic that is inserted between a light source and a condensing lens, forming an effective light source.

Thus, Applicant respectfully submits that pending Claim 16 is in compliance with 35 USC § 112, second paragraph, because it particularly points out and distinctly claims the subject matter which the applicant regards as the invention, and is therefore in condition for allowance. In addition, because Claim 17 depends directly from Claim 16, Claim 17 is also in compliance with 35 USC § 112, second paragraph, and is also in condition for allowance.

U.S.S.N. 10/623,364
Smith
Amendment and Request for Reconsideration

Claim Rejections under 35 USC § 102

Claims 1-8, and 10-17 were rejected under 35 USC § 102(a) as being anticipated by U.S. Patent No. 6,333,776 to Taniguchi ("Taniguchi"). Taniguchi describes a projection exposure apparatus that has a wafer stage that includes "a photoelectric detection system which is capable of measuring distortion." (Taniguchi Col. 5, lines 20-22 and Figure 1). In Taniguchi, the "photoelectric detection system is used in a method wherein image-formation characteristics are measured by directly observing a spatial image formed through the projection optical system PL in contrast to a method wherein a change in image-formation characteristics is detected and corrected. (Taniguchi Col. 5, lines 6-21). The photoelectric detection system includes a pattern plate that has a "light transmitting portion 31 [that] has approximately the same size as that of an image of a fiducial mark 33 on a test reticle TR, as shown in FIG. 2(b), as it is projected on the pattern plate 17." (Taniguchi Col. 5, lines 62-65, and Figures 2(a) and 2(b)). The "wafer stage WST, shown in FIG. 1, is driven such that the image-formation positioned of the fiducial mark 33 on the test reticle TR crosses the light-transmitting portion 31 of the pattern plate 17." (Taniguchi Col. 6, lines 2-5, and Figures 1, and 12(a)). Then, an "image of the fiducial mark 33, which is projected through the projection optical system PL, is measured by the photoelectric sensor 19 through the pattern plate 17." (Taniguchi Col. 6, lines 6-8, and Figures 1, 2(a), and 2(b)).

In the rejection the Examiner did not cite explicit claim limitations felt to be anticipated by Taniguchi but instead appears to take the position that Taniguchi discloses a method that includes some limitations of Claim 1 and some limitations of

U.S.S.N. 10/623,364
Smith
Amendment and Request for Reconsideration

Claim 15. To be responsive to the Examiner's rejection, Applicant will address the claims, and their corresponding limitations, independently referring to the citations to Taniguchi made by the Examiner.

Claims 1-8, and 10-14

Claim 1 is an independent claim from which Claims 2-8 and 10-14 depend, either directly or indirectly. Thus, Claims 2-8 and 10-14 include all of the limitations of Claim 1. The Examiner stated that Taniguchi described "exposing measurement fiducials of an encoded face of an optical element onto a sensing plane; measuring relative positions of the exposed measurement fiducials on the sensing plane" citing to Taniguchi Col. 8, line 51 - Col. 9, line 19.

As described above, Taniguchi does not include the limitation of Claim 1 cited by the Examiner and therefore cannot anticipate Claim 1. Claim 1 recites "exposing measurement fiducials of an encoded face of a reticle onto a sensing plane wherein an optical element is mounted on the reticle" and then "measuring the relative position of the exposed measurement fiducials on the sensing plane."

In contrast to "exposing measurement fiducials" and then measuring the "exposed measurement fiducials" as recited in Claim 1, Taniguchi describes a system where image-formation characteristics are measured by directly observing a spatial image. (Taniguchi Col. 5, lines 26-28, emphasis added). In fact, Taniguchi contrasts his method to "calculation" (i.e. measurement) techniques. See Taniguchi Col. 5, lines 29-30. In addition, Claim 1 recites "measuring the relative position of the exposed measurement fiducials on the sensing plane." This is contrasted to Taniguchi, who describes driving the wafer stage "such that the image-formation

U.S.S.N. 10/623,364
Smith
Amendment and Request for Reconsideration

positioned of the fiducial mark 33 on the test reticle TR crosses the light-transmitting portion 31 of the pattern plate 17." (Taniguchi Col. 6, lines 2-5). Furthermore, Taniguchi does not disclose the limitation of Claim 1 that requires "an optical element is mounted onto the reticle." Nowhere does Taniguchi describe mounting an optical element on the reticle.

Thus, because all of the limitation of Claim 1 are not disclosed by Taniguchi, Claim 1 is not anticipated by Taniguchi. In addition, because Claims 2-8, and 10-14 depend from Claim 1, either directly or indirectly, they are also not anticipated by Taniguchi. Therefore Claims 1-8, and 10-14 are patentable over Taniguchi and in condition for allowance.

Claims 15-17

Claim 15 is an independent claim from which Claims 16 and 17 depend, either directly or indirectly. Thus, Claims 16 and 17 include all of the limitations of Claim 15. The Examiner stated that Taniguchi described "exposing measurement fiducials of an encoded face of an optical element onto a sensing plane; measuring relative positions of the exposed measurement fiducials on the sensing plane", paraphrasing language from Claim 15 and citing to Taniguchi Col. 8, line 51 - Col. 9, line 19.

As described above, Taniguchi does not include the limitation of Claim 15 cited by the Examiner. Claim 15 recites "exposing the plurality of measurement fiducials through a lens onto a sensing plane" and then "measuring positions of the plurality of exposed measurement fiducials on the sensing plane." As noted in the discussion of Claim 1, Taniguchi does not describe "exposing the plurality of measurement fiducials" and does not describe "measuring positions of the plurality of exposed measurement

U.S.S.N. 10/623,364
Smith
Amendment and Request for Reconsideration

fiducials on the sensing plane." Rather, Taniguchi involves direct observation of an image, not measurement of fiducials exposed onto a sensing plane.

Thus, because all of the limitations of Claim 15 are not disclosed by Taniguchi, Claim 15 is not anticipated by Taniguchi. In addition, because Claims 16 and 17 depend from Claim 1, either directly or indirectly, they are also not anticipated by Taniguchi. Therefore Claims 15-17 are patentable over Taniguchi and in condition for allowance.

Claim Rejections under 35 USC § 103

Claim 9 was rejected under 35 USC § 103(a) as being unpatentable over Taniguchi in view of U.S. Patent No. 5,756,238 to Barr et al. ("Barr").

Claim 9 depends directly from Claim 1, thereby incorporating all of the limitations of Claim 1. In contrast to "exposing measurement fiducials" and then measuring the "exposed measurement fiducials" as recited in Claim 9, Taniguchi describes a system where image-formation characteristics are measured by directly observing a spatial image. (Taniguchi Col. 5, lines 26-28, emphasis added). The addition of Barr does not overcome the deficiencies of Taniguchi.

First, there is no suggestion or motivation to combine the teachings of Taniguchi and Barr. Barr describes a system for determining print bias by imaging a print bias target onto a light-sensitive material and then determining the positions of isolated edges in the image. (Barr Col. 2, lines 11-18). Thus, Barr describes a method that Taniguchi distinguished when Taniguchi stated that his method is "in contrast to a method wherein a change in image-formation characteristics is detected by calculation and corrected." See Taniguchi Col. 5, lines 29-30.

U.S.S.N. 10/623,364
Smith
Amendment and Request for Reconsideration

In addition, even if Taniguchi and Barr were combined they would not provide all of the limitations of Claim 9. If Barr's print bias target were used in Taniguchi's projection exposure apparatus, the "photoelectric detection system" of Taniguchi's apparatus would still measure the image-formation characteristics by directly observing a spatial image formed through the projection optical system that would include Barr's print bias target with a corresponding pattern plate. (Taniguchi Col. 5, lines 6-21 and Figure 2(a), emphasis added). This is contrasted with Claim 9 that recites "exposing measurement fiducials" and then measuring the "exposed measurement fiducials."

Thus, neither Taniguchi, nor Barr, either individually or in combination describe all of the limitations of Claim 9. Thus, Claims 9 is patentable over Taniguchi and Barr, either individually or in combination, and is in condition for allowance.

/

/

/

U.S.S.N. 10/623,364
Smith
Amendment and Request for Reconsideration

Conclusion

Applicant respectfully submits that all the pending claims in the application, Claim 1-17, are in condition for allowance. Reconsideration and further examination of the application are requested. A Notice of Allowance is solicited.

Respectfully submitted,
HELLER, EHRMAN, WHITE & McAULIFFE LLP

By: 
Alan C. Gordon
Registration No. 51,220

Attorney Docket No. 38203-6215
Address all correspondence to:
Alan C. Gordon
HELLER EHRMAN WHITE & McAULIFFE, LLP
4350 La Jolla Village Drive, Suite 600
San Diego, CA 92122-1246
Telephone: (858) 450-8400
Facsimile: (858) 587-5360
Email: alangordon@hewm.com

SD 668523 v1
(38203.6215)